# MS-GIST Projects Spring 2023 Friday, April 28

\* There will be 5 minute breaks between each back-to-back presentation to facilitate transitions in Zoom.

\*\* Zoom links are available on request. Please contact Andrew Grogan - atgrogan@arizona.edu

Date/Time	Presentation Title	Student Name
04/28/23 09:00 - 09:25 AM	Assessing the Impacts and Extent of Inundation Due to Sea Level Rise on Long Island, NY	Henry Gobrick
04/28/23 10:30 - 10:55 AM	Landslide Hazard Risk Assessment for Los Angeles County, CA	Katelyn Wolf
04/28/23 12:00 - 12:25 PM	<u>Developing a User-Friendly Tool for</u> <u>Determining and Mapping the Differenced</u> <u>Normalized Burn Ratio</u>	Chloe Hacker
05/02/23 12:30 - 12:55 PM	Techniques on Monitoring Drought Conditions	Bridgette Stewart

# Assessing the Impacts and Extent of Inundation Due to Sea Level Rise on Long Island, NY

Henry Gobrick henrygobrick@arizona.edu

04/28/23, 09:00 - 09:25 AM

#### Abstract:

Sea level rise is a cause of major concern for residents and policymakers of Long Island, New York. Long Island is an immensely populated island located east of New York City. Unfortunately, the island faces massive risk of inundation due to sea level rise. This inundation is a direct result of climate change. At its current pace, sea level rise will cause the uprooting of lives and communities for the next generation of Long Island residents. Even for the current generation, sea level rise poses a sizeable risk to many. This project employs a multitude of geoprocessing and analytical tools from ArcGIS Pro to quantify and assess the risk posed to Long Island. This risk is assessed at a sea level rise of 1 foot, and again at a rise of 4 feet. These two levels are consistent with studies that suggest these levels are realistic values to project for Long Island by the year 2100. This is with one foot being the probable minimum and four feet being the maximum. Additionally, this project utilizes census data for delving into exactly which communities are most at risk, in terms of demographic and income. It is evident that if changes are not made in an attempt to mitigate climate change, Long Island and its wealth of communities and demographics will face devastation. Many homes will be destroyed or completely underwater, shorelines will continue to move inland, and a number of different demographics that reside on Long Island will be deracinated.

Keywords: Sea Level Rise, Long Island, Inundation, Risk, Climate Change

## Landslide Hazard Risk Assessment for Los Angeles County, CA

Katelyn Wolf kpwolf@email.arizona.edu

04/28/23, 10:30 - 10:55 AM

#### Abstract:

Landslides are a natural disaster caused when loose sediment and debris move downhill. Southern California has experienced increasing numbers of landslides in recent years. This is primarily due to high rainfall after long periods of drought, causing dry soil to be displaced by the high volume of precipitation, runoff, and flooding. Additionally, wildfires in the region have destroyed natural vegetation and root systems that would have held soil in place and prevented erosion. Due to the increased risk of landslides in the region, it is important for residents, government officials, and other local stakeholders to identify high risk areas and take measures to prevent and mitigate the effects of these climatic disasters. The region of focus was Los Angeles County, due to its highly populated residential areas as well as important infrastructure that would be affected by a landslide event. In order to identify high risk regions, a landslide hazard risk assessment was performed in ArcGIS Pro. The main factors used in this assessment were average annual precipitation, slope, aspect, land use/cover, and recent wildfire perimeters. A weighted overlay and visual analysis were used to identify areas at high risk of experiencing a landslide. The main at-risk region was determined to be Angeles National Forest and its neighboring communities. To prevent future landslides and mitigate potential damage, it is recommended that the local governments improve drainage routes for runoff, build debris catches along major roads, stabilize slopes by planting vegetation, and regularly update and publicize emergency guidelines for residents.

Keywords: landslide, land cover, Los Angeles, wildfire, hazard risk assessment

# Developing a User-Friendly Tool for Determining and Mapping the Differenced Normalized Burn Ratio

Chloe Hacker chloe.hacker@arizona.edu

04/28/23, 12:00 - 12:25 PM

#### Abstract:

When it comes to wildfire recovery efforts, time is of the essence. Analyses to plan restoration efforts need to be conducted within seven days of wildfire containment. This window ensures that the data collected is most reflective of postfire conditions. It is necessary for the satellite images to capture the near infrared and shortwave infrared reflectance values from the ground before vegetation begins to grow back. This project aims to create a user-friendly tool for analyzing burn severity of wildfires. The goal is to be able to automate these analyses so they can be used for post wildfire land rehabilitation. The difference between pre-fire and post-fire normalized burn ratio provides information regarding where the land was most and least damaged from a wildfire, helpful for informing land managers with post fire recovery efforts, if necessary. A tool developed in this project uses Landsat imagery from before and after the wildfire and runs it through a python script to automatically calculate the difference between pre-fire and post-fire normalized burn ratio and map it. From here, the tool can be applied to any wildfire that has imagery available from before it started and shortly after its containment. The results of this project are a python script to automate mapping the differenced normalized burn ratio that is customizable to be run on any computer with any data saved.

Keywords: wildfire, python, burn ratio, automate

## **Techniques on Monitoring Drought Conditions**

Bridgette Stewart bridgettes@arizona.edu

05/02/23, 01:30 - 01:55 PM

#### Abstract:

Central Valley, California is one of the largest producers of agricultural products in the United States; however, with its on-going drought conditions, farmers have had difficulty maintaining yields with a sparse water supply. California has always gone through cyclic droughts, and with remote sensing, these droughts can be investigated to see how it impacts the California agribusiness. This project investigates techniques to analyze drought conditions in the agricultural regions of Central Valley by utilizing imagery analysis through USGS Earth Explorer and manipulating the data in ArcGIS Pro. The project explores the digital elevation model, as well as methods including indices such as the Normalized Difference Vegetation Index and Normalized Difference Moisture Index to see how well these procedures accurately depict drought conditions in the raster calculator function to highlight areas that have either been affected by or changed due to the drought. The results show how effective the digital elevation model is for detecting changes in elevation over the 7-year period, and if the normalized difference indices helped with identifying areas where agriculture suffered the most.

Keywords: NDVI, NDMI, DEM, change detection, drought